

REMARKS

Claims 1-19 are pending. Claims 1-19 are rejected. Claim 18 has been amended.

No new matter has been added.

Oath/Declaration

A Declaration and Power of Attorney for a Patent Application was filed for each inventor in the present invention. Duplicate copies of these declarations are appended hereto, as is a copy of the postcard received from the PTO in response to the filing. Applicants note that inventors Nemecek and Roe each submitted separate declarations, not signed by the other. Applicants further note that inventor Nemecek executed the declaration on January 2, 2002, and inventor Roe executed the declaration on January 7, 2002.

35 U.S.C. 112 ¶ 1 Rejections

Claims 3, 7-10, and 15-19 are rejected under 35 U.S.C. 112 ¶ 1 as failing to comply with the written description requirement. Specifically, the rejection suggests that the recitation in Claims 3, 7, and 15 of “replacing the microcontroller clock with the gatekeeper clock for clocking the virtual microcontroller when a watchdog event occurs” is inadequately described in the specification. More specifically, the rejection suggests that this language implies that the microcontroller clock drives the virtual microcontroller, a connection not recited in the claims. Applicant respectfully disagrees.

The Examiner is respectfully directed to the specification, specifically page 12, ln. 13, through page 3, ln. 18, describing, in one embodiment, the four line interface connecting the virtual microcontroller and the microcontroller. The Examiner is respectfully further directed to page 14, ln. 22, through page 15, ln. 17, further describing this interface, and specifically the clock signals passed. The Examiner is respectfully further directed to page 26, ln. 3, through page 19, ln. 5, detailing the operation of gatekeeper circuit 602 in several embodiments of the present invention.

Applicants respectfully assert that one having ordinary skill in the art would thus understand from the specification how to practice the embodiments of the invention disclosed in Claims 3, 7, and 15. Therefore, Applicants respectfully contend that Claims 3, 7, and 10 overcome the rejection under 35 U.S.C. 112 ¶ 1. Accordingly, Applicants respectfully submit that Claims 8-10, dependent upon Claim 7, and Claims 16-19, dependent upon Claim 15, overcome the basis for rejection under 35 U.S.C. 112 ¶ 1, as they are dependent on an allowable base claim.

Claims 3, 7-10, and 15-19 are rejected under 35 U.S.C. 112 ¶ 1 as failing to comply with the enablement requirement. The rejection contends that Claims 3, 7, and 15 require physical replacement of one tangible component with a second tangible component. Applicants respectfully submit that no such requirement is set forth in Claims 3, 7, and 15, in either explicit or implied terms. Further, Applicants assert that one having ordinary skill in the art would understand the concept of switching, e.g.,

multiplexing, as applied to electronic circuits, and would be enabled to practice the embodiments of the present invention recited in Claims 3, 7, and 15.

Therefore, Applicants respectfully contend that Claims 3, 7, and 10 overcome the rejection under 35 U.S.C. 112 ¶ 1. Accordingly, Applicants respectfully submit that Claims 8-10, dependent upon Claim 7, and Claims 16-19, dependent upon Claim 15, overcome the basis for rejection under 35 U.S.C. 112 ¶ 1, as they are dependent on an allowable base claim.

35 U.S.C. 112 ¶ 2 Rejections

Claims 3, 7-10, and 15-19 are rejected under 35 U.S.C. 112 ¶ 1 as being indefinite, for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the rejection suggests that the recitation in Claims 3, 7, and 15 of “replacing the microcontroller clock with the gatekeeper clock for clocking the virtual microcontroller when a watchdog event occurs” is inadequately described in the specification. More specifically, the rejection suggests that this language implies that the microcontroller clock drives the virtual microcontroller, a connection not recited in the claims. Applicant respectfully disagrees.

With respect to Claims 3, 7, and 15, Applicants assert the argument set forth previously, with respect to 35 U.S.C. 112 ¶ 1. Applicants respectfully submit that the specification provides sufficient detail to enable one of ordinary skill in the art to determine the metes and bounds of the limitations of Claims 3, 7, and 15. Moreover,

Applicants respectfully assert that one having ordinary skill in the art would understand the use of the term “replacing” to suggest substitution or switching of one clock signal with another, rather than physical replacement of circuitry. Therefore, these Claims overcome the basis for rejection under 35 U.S.C. 112 ¶ 2. Accordingly, Applicants respectfully submit that Claims 8-10, dependent upon Claim 7, and Claims 16-19, dependent upon Claim 15, overcome the basis for rejection under 35 U.S.C. 112 ¶ 1, as they are dependent on an allowable base claim.

Claims 5-6, 9-10, 12-13, and 17-18 are rejected under 35 U.S.C. 112 ¶ 2 as being indefinite, for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to Claims 5, 9, 12, and 17, the rejection suggests that “detecting that the microcontroller clock is not active” implies a relative measure not defined by the claim, and notes that in the art, a clock signal is generally “pulsed,” such that periods of inactivity are expected. The rejection further suggests that it is unclear how the limitation that “a data bus is in a prescribed logic state” applies to the embodiments of the present invention recited in Claim 5. Applicants respectfully disagree.

The Examiner is respectfully directed to page 28, ln. 5-16 of the specification, providing an illustration of how one embodiment of the present invention operates, specifically how Gatekeeper 602 handles a watchdog event. Applicants assert that one of ordinary skill in the art would understand using the combination of the state of the clock

signal and the state of a data bus to determine whether or not a watchdog event has occurred. Therefore, Claims 5, 9, 12, and 17 overcome the basis for rejection under 35 U.S.C. 112 ¶ 2. Accordingly, Applicants respectfully submit that Claims 6, 10, and 13, dependent upon Claims 5, 9, and 12, respectively, overcome the basis for rejection under 35 U.S.C. 112 ¶ 1, as they are dependent on an allowable base claim.

Claim 18 has been amended to properly depend from Claim 17, and the foregoing arguments apply equally to Claim 18.

The Rejection's Claim Interpretation

The rejection states that, with respect to Claim 15, the limitation of “disabling a microcontroller clock signal” was read as “halting the microcontroller and running the virtual microcontroller.” Applicants respectfully object to this substitution. No objection was presented in the rejection as to the language of “disabling a microcontroller clock signal,” making the origin of and reason for this interpretation unclear. Applicants respectfully submit that the interpretation of the claims should properly be determined as the claims were presented by Applicants.

The rejection further states that, with respect to Claims 5, 9, 12, and 17, the limitations of these Claims are so different from the teachings of the specification that the Examiner cannot interpret them. Applicants understand this statement to be based upon the 35 U.S.C. 112 rejections, discussed above. Applicants respectfully assert that the

limitations of these Claims arise directly from the teachings of the specification, as discussed above, rendering moot this interpretation of the language of these Claims.

35 U.S.C. 103(a) Rejections

Claims 1-2, 4-6, and 8-19 are rejected under 35 U.S.C. 103(a) as being obvious over Profit, U.S. Patent No. 5,911,059.

The Examiner is respectfully directed to independent Claim 1, which, as amended, recites that an embodiment of the present invention is directed to:

An In-Circuit Emulation system, comprising
 a microcontroller having a microcontroller clock;
 a virtual microcontroller running in lock-step synchronization with the microcontroller;
 a host computer running In-Circuit Emulation debug software, the host computer being in communication with the virtual microcontroller;
and
 a gatekeeper circuit coupled to the virtual microcontroller and the microcontroller, the gatekeeper circuit detecting when a watchdog timer expires in the microcontroller and notifying the host computer that the watchdog event has occurred.

Claims 11 and 15 recite similar limitations. Claims 2, 4-6, and 8-10 are dependent upon Claim 1, and recite additional features of the claimed invention. Claims 12-14 are dependent upon Claim 11, and recite additional features of the claimed invention. Claims 16-19 are dependent upon Claim 15, and recite additional features of the claimed invention.

The rejection suggests that Profit discloses every element of Claim 1 to such an extent that it would be obvious to one having ordinary skill in the art to adapt the device

described in Profit to achieve the embodiments of the present invention recited in Claim

1. Applicant has reviewed Profit, and respectfully disagrees. Applicant contends that Profit fails to disclose a virtual microcontroller running in lock-step synchronization with the microcontroller, as claimed. Applicant further contends that Profit fails to disclose a host computer running In-Circuit Emulation debug software, as claimed.

The rejection suggests that Profit discloses a virtual microcontroller running in lock-step synchronization with the microcontroller, as claimed. However, the portion of Profit offered to demonstrate a virtual microcontroller describes a hardware simulator running on a host computer, see col. 5, ln. 63-67. Profit explains that this hardware simulator is used to emulate the target *circuitry*, which is the external circuitry that interacts with the target microprocessor, see col. 1, ln. 20-24. Profit describes the hardware simulator as being a conventional software program that simulates the electrical and logical activity of the *target circuitry* as seen by the target processor; see col. 6, ln. 25-29. From the example provided, the hardware simulator of Profit is principally a processor model shell, which simulates activity at the target processor's pins; however, it does not emulate the processor's functionality, see col. 6, ln. 25-48. The hardware simulator of Profit is not a virtual microcontroller.

The rejection also suggests that Profit discloses a host computer running In-Circuit Emulation debug software. However, the portion of Profit referenced to demonstrate In-Circuit Emulation debug software does not disclose the operation of In-

Circuit Emulation debug software, but rather states a generalization about what software might be running on the host computer, and provides an example of a software package for designing the target *circuitry*; see col. 6, ln. 49-60.

With respect to Claim 11, the rejection suggests that Profit discloses determining that a watchdog timer event has occurred in a microcontroller, the microcontroller running in lock-step synchronization with a virtual microcontroller, as claimed. The rejection further suggests that Profit discloses notifying a host computer running In-Circuit Emulation software that a watchdog timer event has occurred. Applicants respectfully disagree. As noted above, Profit does not disclose a virtual microcontroller running in lock-step synchronization with a microcontroller. Also as noted above, Profit does not disclose a host computer running In-Circuit Emulation software.

With respect to Claim 15, the rejection suggests that Profit discloses determining that a watchdog timer event has occurred in a microcontroller, the microcontroller running in lock-step synchronization with a virtual microcontroller, as claimed. The rejection further suggests that Profit discloses notifying a host computer running In-Circuit Emulation software that a watchdog timer event has occurred. Applicants respectfully disagree. As noted above, Profit does not disclose a virtual microcontroller running in lock-step synchronization with a microcontroller. Also as noted above, Profit does not disclose a host computer running In-Circuit Emulation software.

Therefore, Profit does not anticipate or render obvious the embodiments of the present invention recited in Claims 1, 11, and 15.

Applicant respectfully submits that Claims 1, 11, and 15 overcome the basis for rejection under 35 U.S.C. 103(a), and are in condition for allowance. Accordingly, Applicant respectfully submits that Claims 2, 4-6, and 8-10, dependent on Claim 1, Claims 12-14, dependent upon Claim 11, and Claims 16-19, dependent on Claim 15, overcome the basis for rejection under 35 U.S.C. 103(a), as they are dependent on allowable base claims.



Conclusion

In light of the above-listed amendments and remarks, Applicants respectfully request allowance of the remaining Claims.

The Examiner is urged to contact Applicants' undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

Respectfully submitted,

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